

Exemplary haplotype diversity distribution (8 SNPs / 84Kb)

Potential SNP/Haplotype Combinations  
 $2^{10} = 1024$

<u>Observed Haplotypes</u>	<u>Population Distribution (Frequency)</u>	
1. GGACAACC	283	(83.2%)
2. AATTCGGG	40	(11.8%)
3. GATTAGCC	2	(0.6%)
4. GGTCAAGC	2	(0.6%)

FIGURE 1

Exemplary Haplotype/SNP Allele State Matrix

50

	SNP <sub>1</sub>	SNP <sub>2</sub>	SNP <sub>3</sub>	SNP <sub>4</sub>	
Haplotype 1	G	G	G	A	
Haplotype 2	A	A	G	G	
Haplotype 3	A	A	A	G	
Haplotype 4	G	A	A	A	

75

25 ~

Potentially Redundant  
SNP Information

80 — [ ] SNP<sub>1</sub> SNP<sub>2</sub> SNP<sub>3</sub>

	SNP <sub>1</sub>	SNP <sub>2</sub>	SNP <sub>3</sub>	
Haplotype 1	G	G	G	
Haplotype 2	A	A	G	
Haplotype 3	A	A	A	
Haplotype 4	G	A	A	

90 — [ ] SNP<sub>2</sub> SNP<sub>3</sub> SNP<sub>4</sub>

	SNP <sub>2</sub>	SNP <sub>3</sub>	SNP <sub>4</sub>	
Haplotype 1	G	G	A	
Haplotype 2	A	G	G	
Haplotype 3	A	A	G	
Haplotype 4	A	A	A	

FIGURE 2

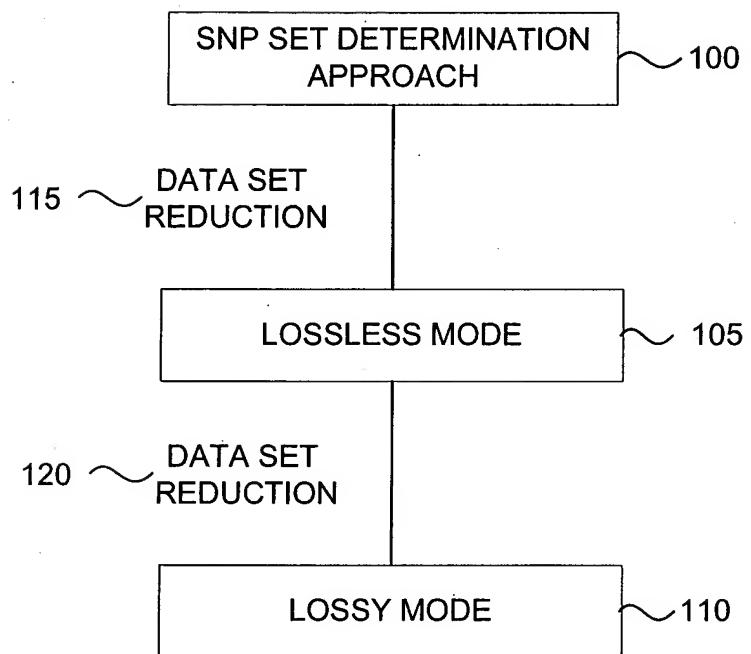
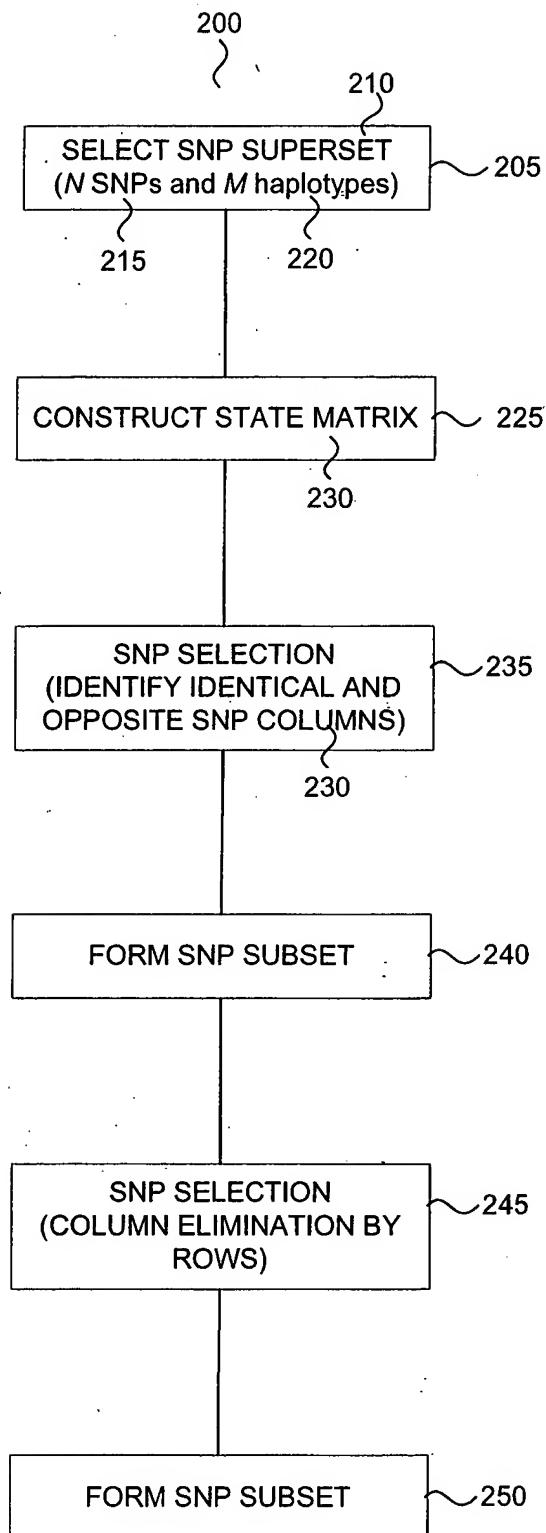


FIGURE 3



Haplotype/SNP Allele State Matrix

	SNP <sub>1</sub>	SNP <sub>2</sub>	SNP <sub>3</sub>	SNP <sub>4</sub>	SNP <sub>5</sub>
Haplotype 1	G	G	G	A	G
Haplotype 2	A	A	G	G	A
Haplotype 3	A	A	A	G	A
Haplotype 4	G	A	A	A	A

FIGURE 4B

FIGURE 4A

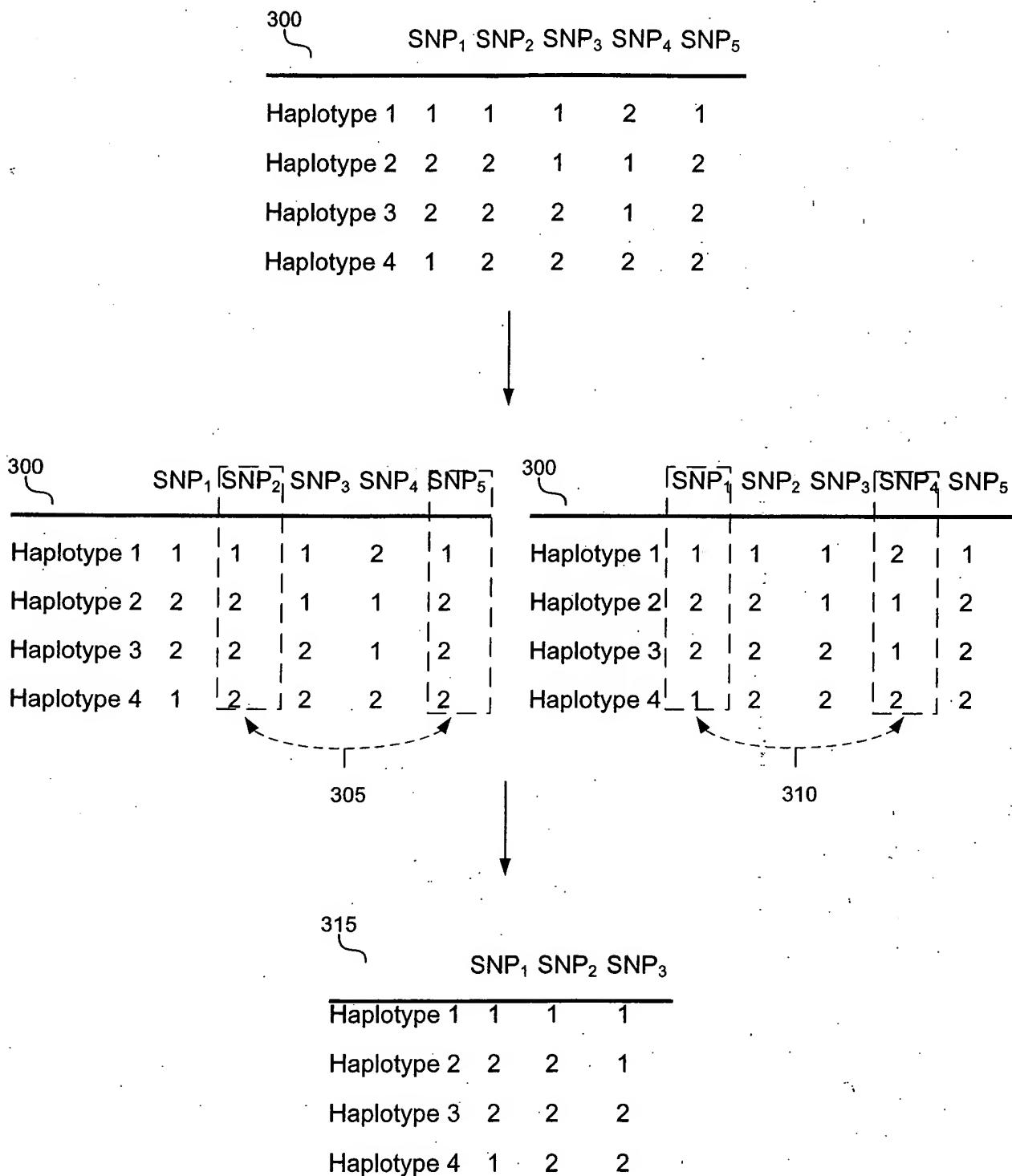


FIGURE 5A

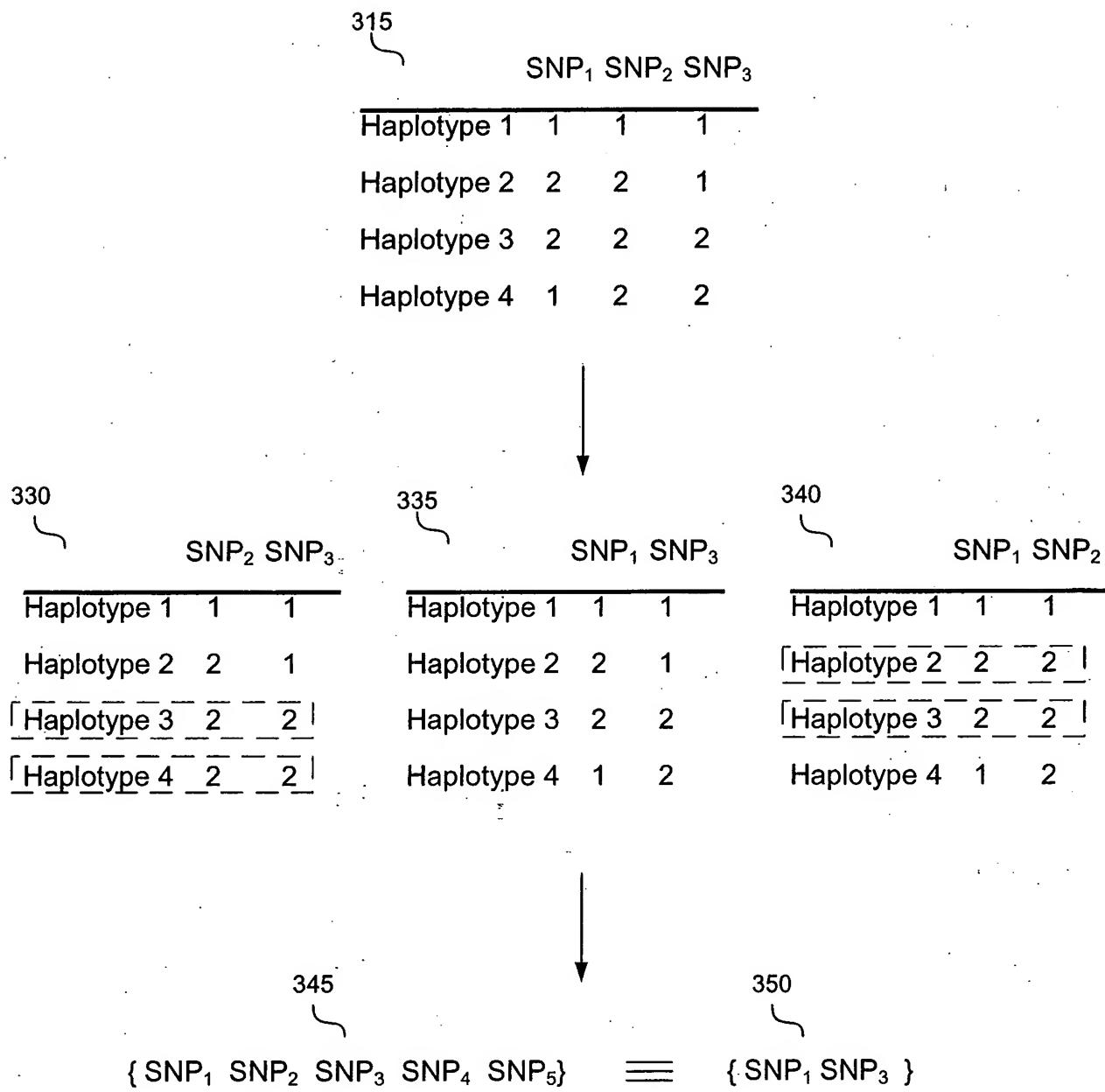


FIGURE 5B

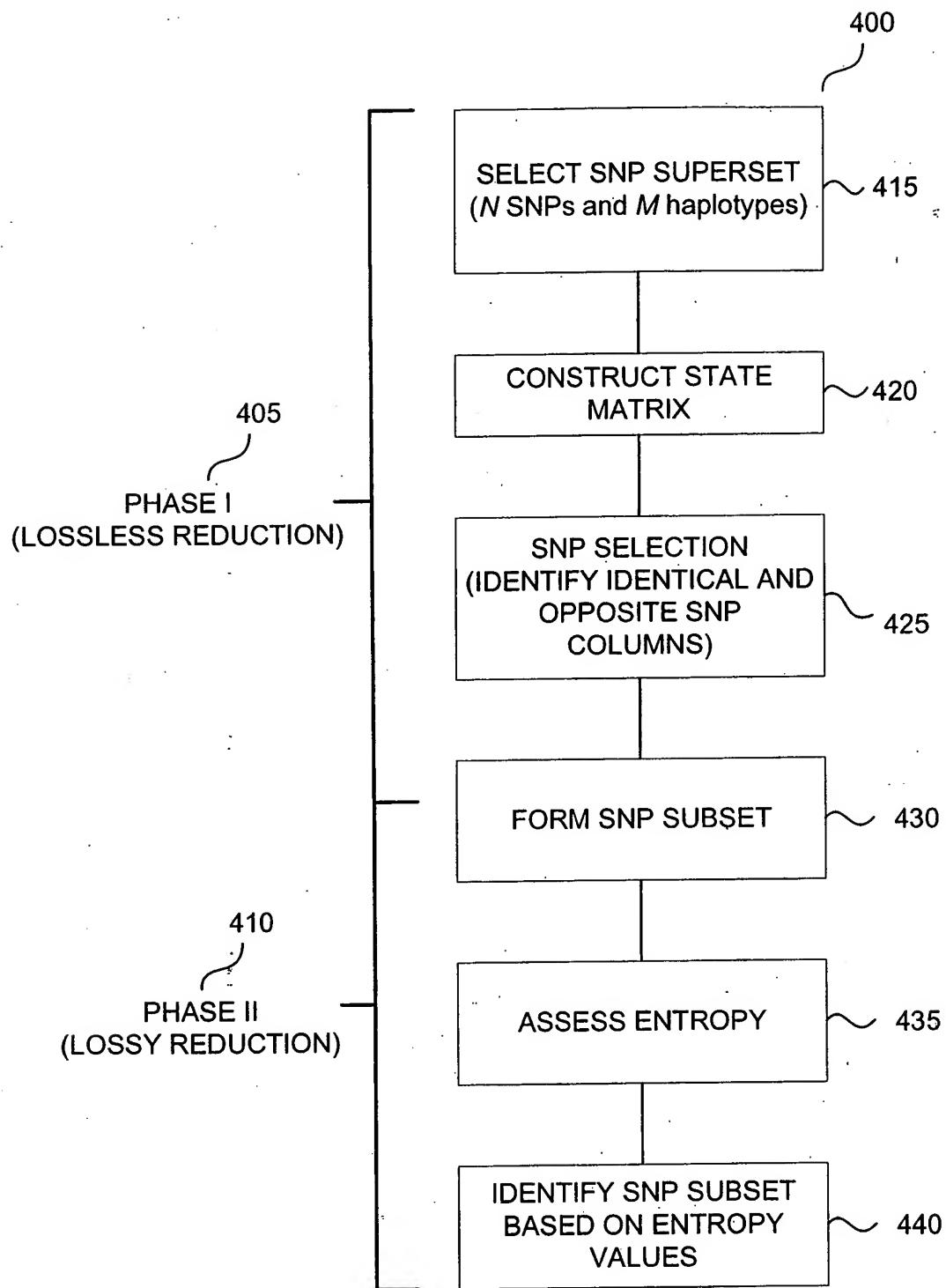


FIGURE 6A

*IDENTIFICATION OF HAPLOTYPE DIVERSITY*  
*De La Vega et al.*  
*Appl. No.: Unknown Atty Docket: ABIOS.048A*

*Appl. No.: Unknown*      *Atty Docket: ABIOS.048A*

Appl. No.: Unknown Atty Docket: ABIOS.048A

## ORIGINAL STATE MATRIX / SNP SUPERSET

455

SNP No.

Haplotype Number	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.1136	1	1	1	1	1	2	1	2	1	2	1	1	2	2	2	1	2
2	0.4318	1	1	1	1	1	2	1	2	1	2	1	1	2	2	2	2	2
3	0.0114	1	1	1	2	2	1	2	1	2	1	2	2	1	1	1	1	1
4	0.0454	1	2	2	1	1	2	1	2	1	2	1	1	2	2	2	1	1
5	0.0454	2	1	1	1	1	2	1	2	1	2	1	1	2	2	2	1	2
6	0.0118	2	2	2	2	2	1	2	1	2	1	2	1	1	1	1	1	1
7	0.3292	2	2	2	2	2	1	2	1	2	1	2	2	1	1	1	1	1
8	0.0114	2	2	2	2	2	1	2	1	2	2	1	2	1	1	1	1	1

460

FIGURE 6B

## RESULTING STATE MATRIX FOLLOWING APPLICATION OF LOSSLESS APPROACH

Haplotype Number	P	SNP <sub>1</sub>	SNP <sub>2</sub>	SNP <sub>4</sub>	SNP <sub>10</sub>	SNP <sub>12</sub>	SNP <sub>15</sub>	SNP <sub>17</sub>
1	0.1136	1	1	1	2	1	1	2
2	0.4318	1	1	1	2	1	2	2
3	0.0114	1	1	2	1	2	1	1
4	0.0454	1	2	1	2	1	1	1
5	0.0454	2	1	1	2	1	1	2
6	0.0118	2	2	2	1	1	1	1
7	0.3292	2	2	2	1	2	1	1
8	0.0114	2	2	2	2	2	1	1

FIGURE 6C

## IDENTIFICATION OF HAPLOTYPE DIVERSITY

De La Vega et al.

Appl. No.: Unknown Atty Docket: ABIOS.048A

475      480      485      490      468  
 470

No. of SNPs ( $k$ )	No. of Combinations ***	Optimal Set of $k$ SNPs	Haplotype Distribution Resulting from the Optimal SNP Set	Resulting Entropy ( $H$ ) (bits)
7	8	{SNP <sub>1</sub> , SNP <sub>2</sub> , SNP <sub>4</sub> , SNP <sub>10</sub> , SNP <sub>12</sub> , SNP <sub>15</sub> , SNP <sub>17</sub> }	(0.114, 0.432, 0.011, 0.045, 0.045, 0.012, 0.329, 0.011)	2.0351
6	28	{SNP <sub>1</sub> , SNP <sub>2</sub> , SNP <sub>10</sub> , SNP <sub>12</sub> , SNP <sub>16</sub> , SNP <sub>17</sub> }	(0.114, 0.432, 0.011, 0.045, 0.045, 0.012, 0.329, 0.011)	2.0351
5	56	{SNP <sub>1</sub> , SNP <sub>10</sub> , SNP <sub>12</sub> , SNP <sub>16</sub> , SNP <sub>17</sub> }	(0.114, 0.432, 0.011, 0.045, 0.045, 0.012, 0.329, 0.011)	2.0351
4	70	{SNP <sub>1</sub> , SNP <sub>12</sub> , SNP <sub>16</sub> , SNP <sub>17</sub> }	(0.114, 0.432, 0.011, 0.045, 0.045, 0.012, 0.341)	1.9631
3	56	{SNP <sub>1</sub> , SNP <sub>16</sub> , SNP <sub>17</sub> }	(0.114, 0.432, 0.057, 0.045, 0.352)	1.8475
2	28	{SNP <sub>12</sub> , SNP <sub>16</sub> }	(0.216, 0.432, 0.397)	1.5311
1	8	{SNP <sub>16</sub> }	(0.5632, 0.4318)	0.9865

FIGURE 6D

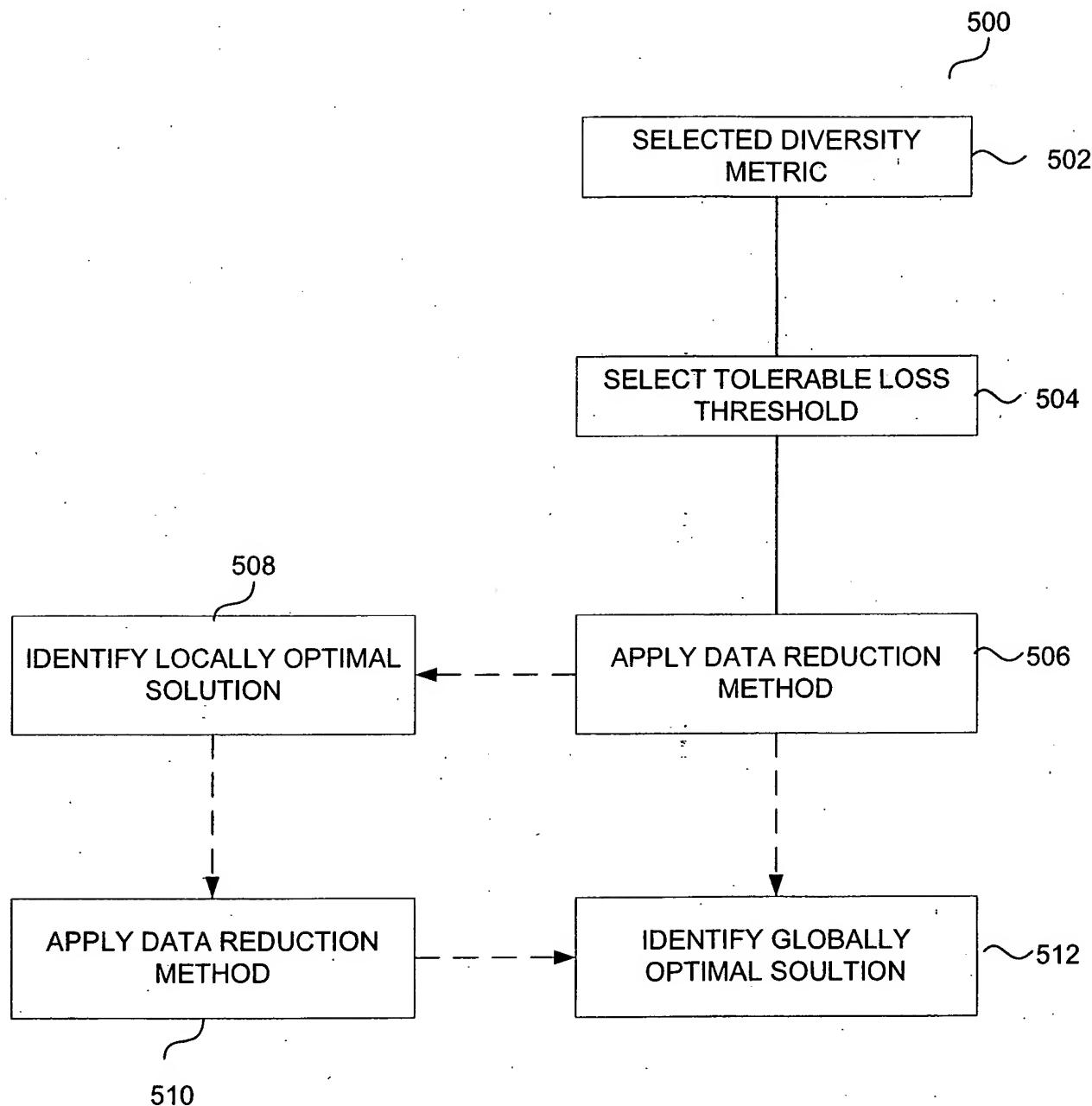


FIGURE 7

	SNP <sub>1</sub>	SNP <sub>2</sub>	SNP <sub>3</sub>	SNP <sub>4</sub>	557	557
Hap1	1	1	1	2		P
Hap2	2	2	1	1	0.22	
Hap3	2	2	2	1	0.07	
Hap4	1	2	2	2	0.08	

No. of SNPs (K)	No. of Combinations $4! / (K! (4-K)!)$	Optimal Set of SNPs	Remaining Info (H)
4	1	{SNP <sub>1</sub> SNP <sub>2</sub> SNP <sub>3</sub> SNP <sub>4</sub> }	1.461
3	4	{SNP <sub>1</sub> SNP <sub>2</sub> SNP <sub>3</sub> }	1.461
559 ~ 2	6	{SNP <sub>1</sub> SNP <sub>3</sub> }	1.461
1	4	{SNP <sub>2</sub> }	0.951

FIGURE 8

Chr.	Pop.	Total No. of SNPs	Mean Spacing Between SNPs (bp)	546	548	550	552	556	Mean Min. SNP per Block	
									Mean SNPs per Block	Lossless
6	A	2,504	24,386	10,840	646	23,000	3,88	2,94	2,44	2,33
	C	4,009	23,694	10,630	883	34,000	4,54	2,86	2,47	2,27
21	A	955	12,424	7,382	242	14,933	3,95	2,92	2,39	2,32
	C	1,555	11,921	7,031	336	21,032	4,63	2,88	2,47	2,27
22	A	1,405	10,041	6,035	350	13,714	4,01	2,99	2,47	2,27
	C	1,783	9,080	7,760	417	17,505	4,28	2,81	2,47	2,27

FIGURE 9

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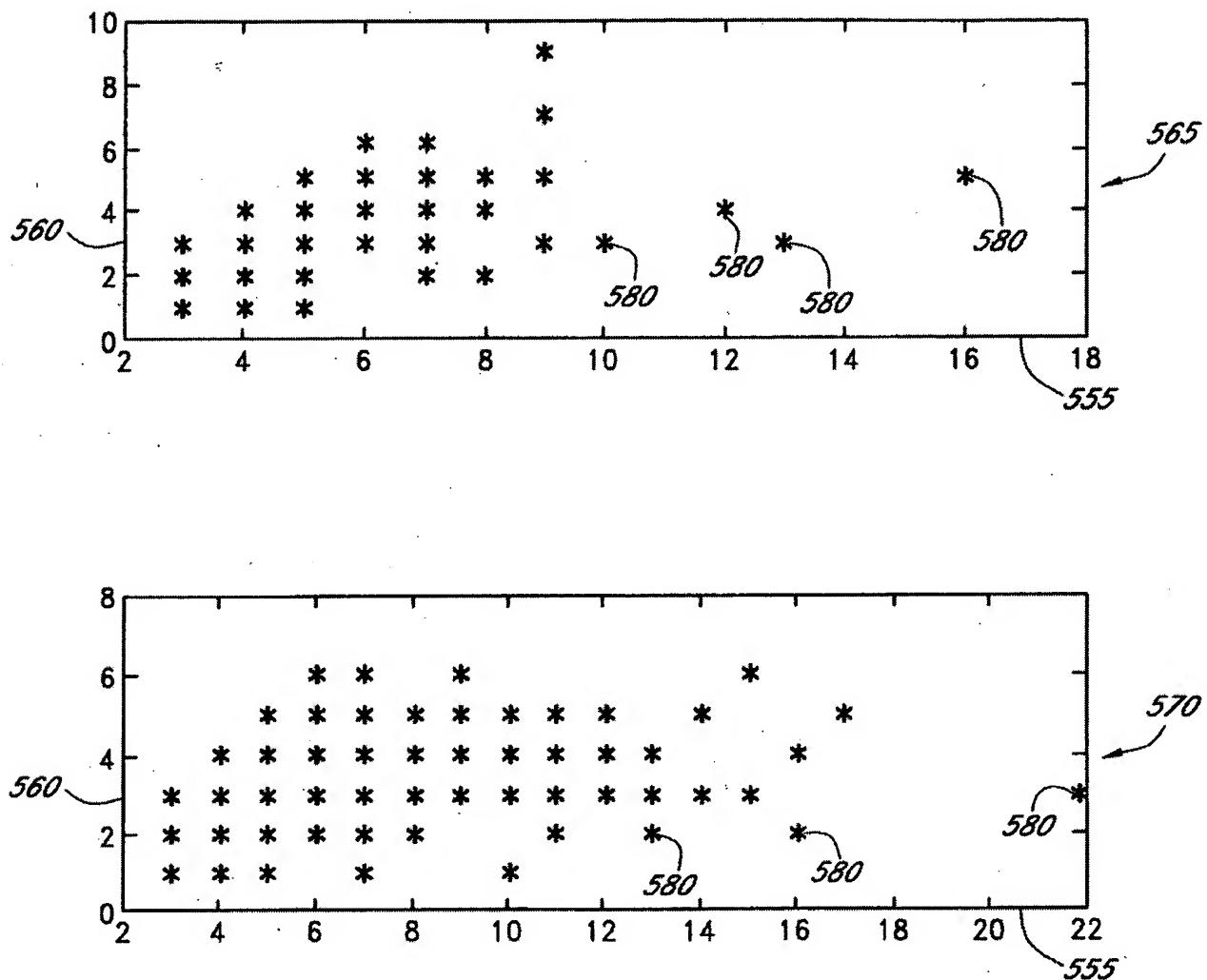


FIGURE 10